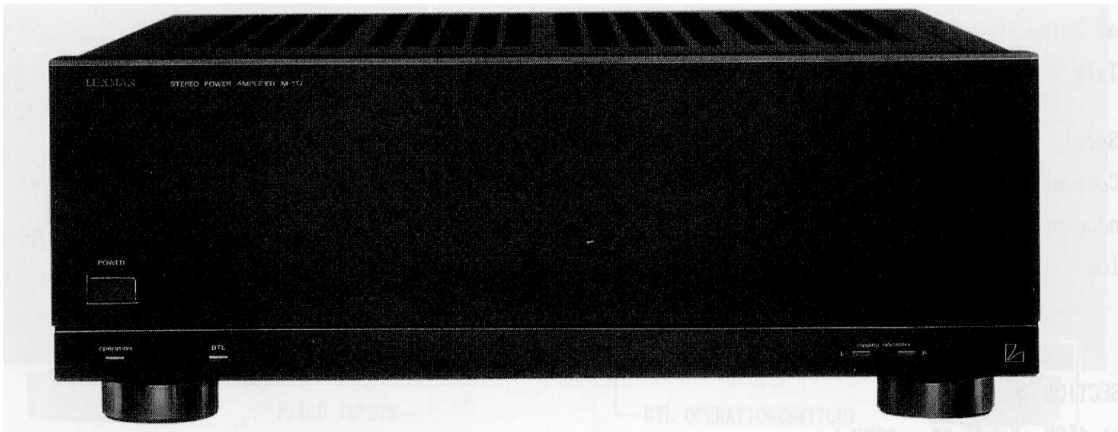
# SERVICE MANUAL

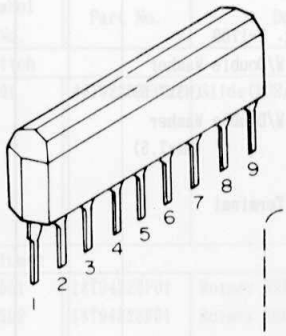
## Stereo Integlated Amplifier

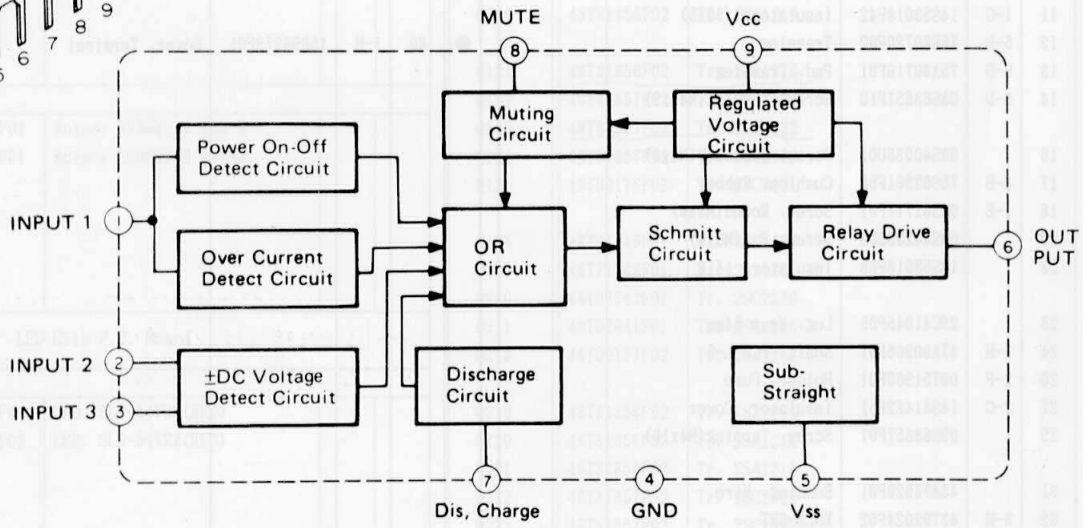
# M-117



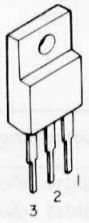
# Semi-Conductor Lead Identifications

TA7317P:IC301

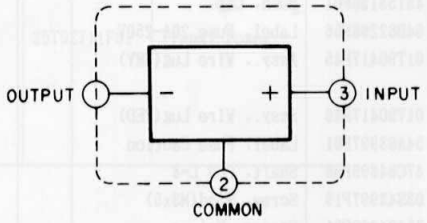


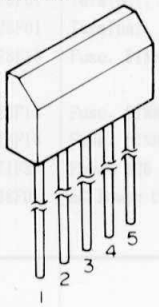

NJM78M12A:IC302




1. Output
2. Common
3. Input




2SA995 :Q101,201
2SC2291:Q102,202




1. Emitter 1
2. Collector 1
3. Base (Common)
4. Collector 2
5. Emitter 2

2SA1208:Q103,104,203,204

1. Emitter
2. Collector
3. Base

4. Removal of Main-Amp(R) P.C. Board

(1) After removal of Heatsink(R) remove twenty tow screws marked " * " as shown in Figure 6.

NOTE:Take care of handling each transistors when removing the Main-Amp(R) P.C. Board.

5. Removal of Heatsink(L) and Main-Amp(L) P.C. Board

(1) Remove in the same way above mentioned.

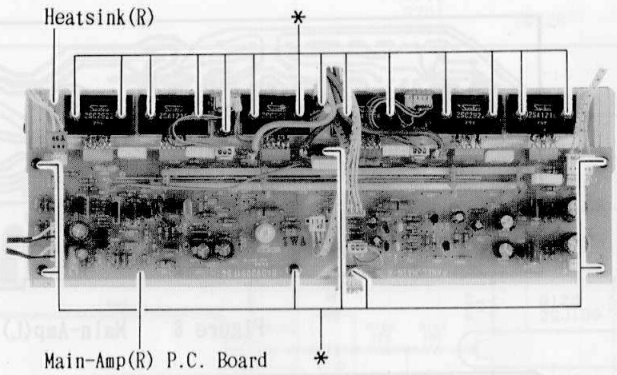



Figure 6

# Adjustment Procedures

1. Connection

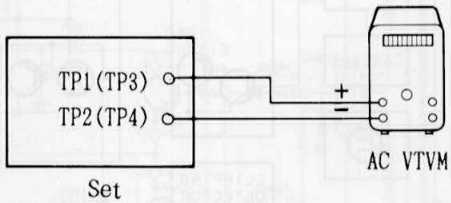



Figure 7

2. Control Setting

| | |
|---|---|
| Attenuator(Left)····· Minimum | Power Switch ····· ON |
| Attenuator(Right) ····· Minimum | Others ····· OFF |

3. Adjustment Procedure

(1) Idling Adjustment(Figure 7,8 and 9)

Adjust VR101(VR201) so that voltage between TP1(TP3) and TP2(TP4) reaches 4 ±0.5mV

# Adjustment Locations

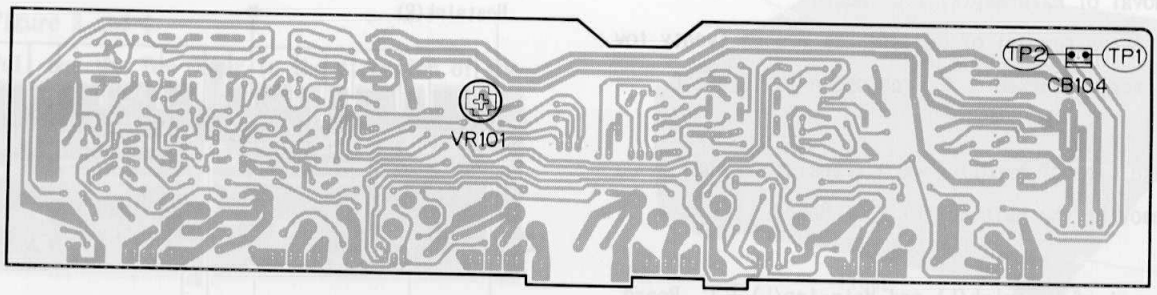



Figure 8 Main-Amp(L) P.C. Board(Component Side)

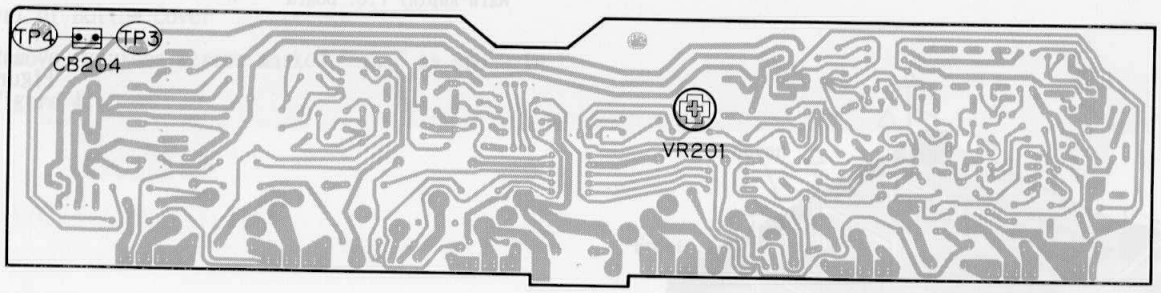
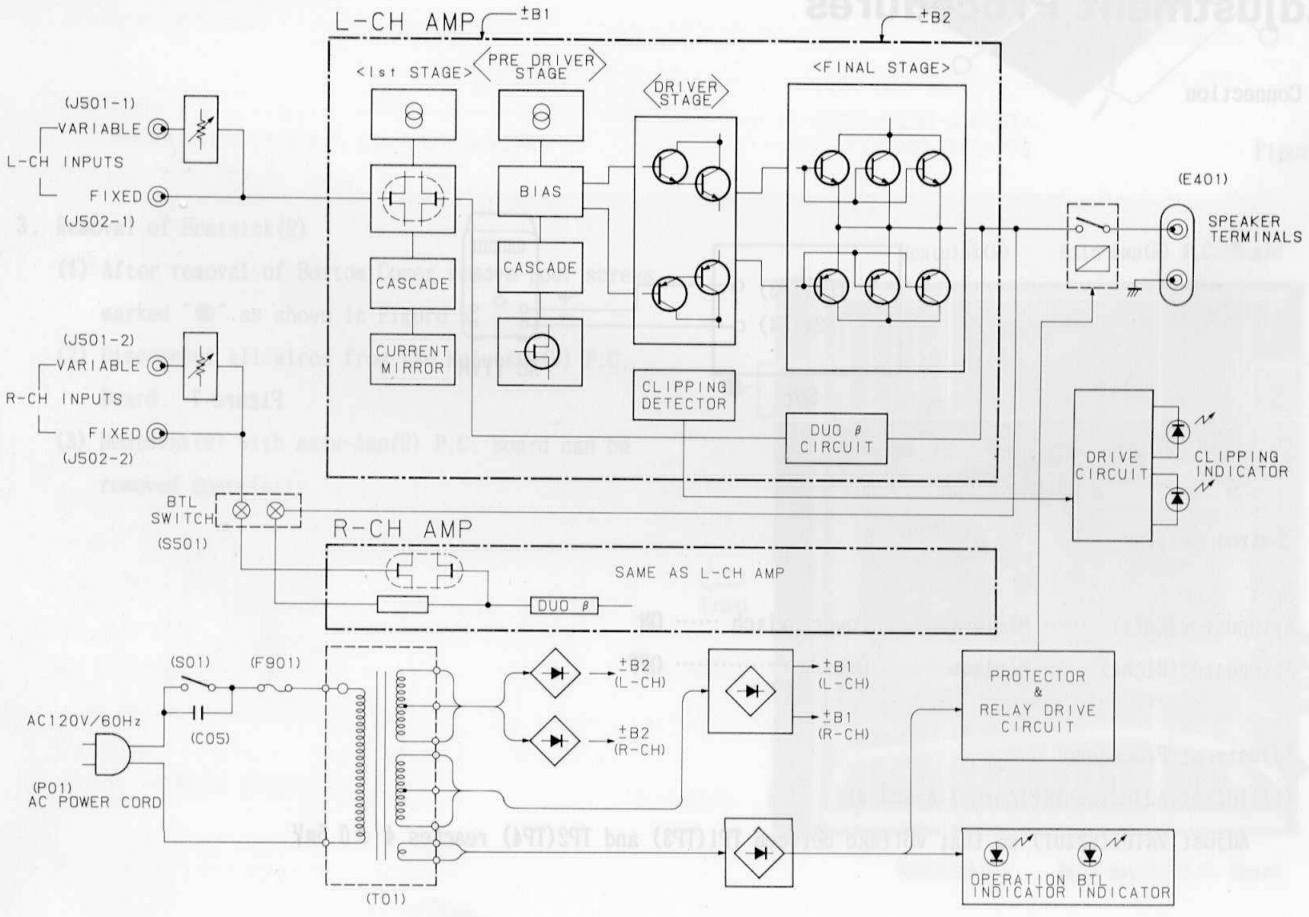


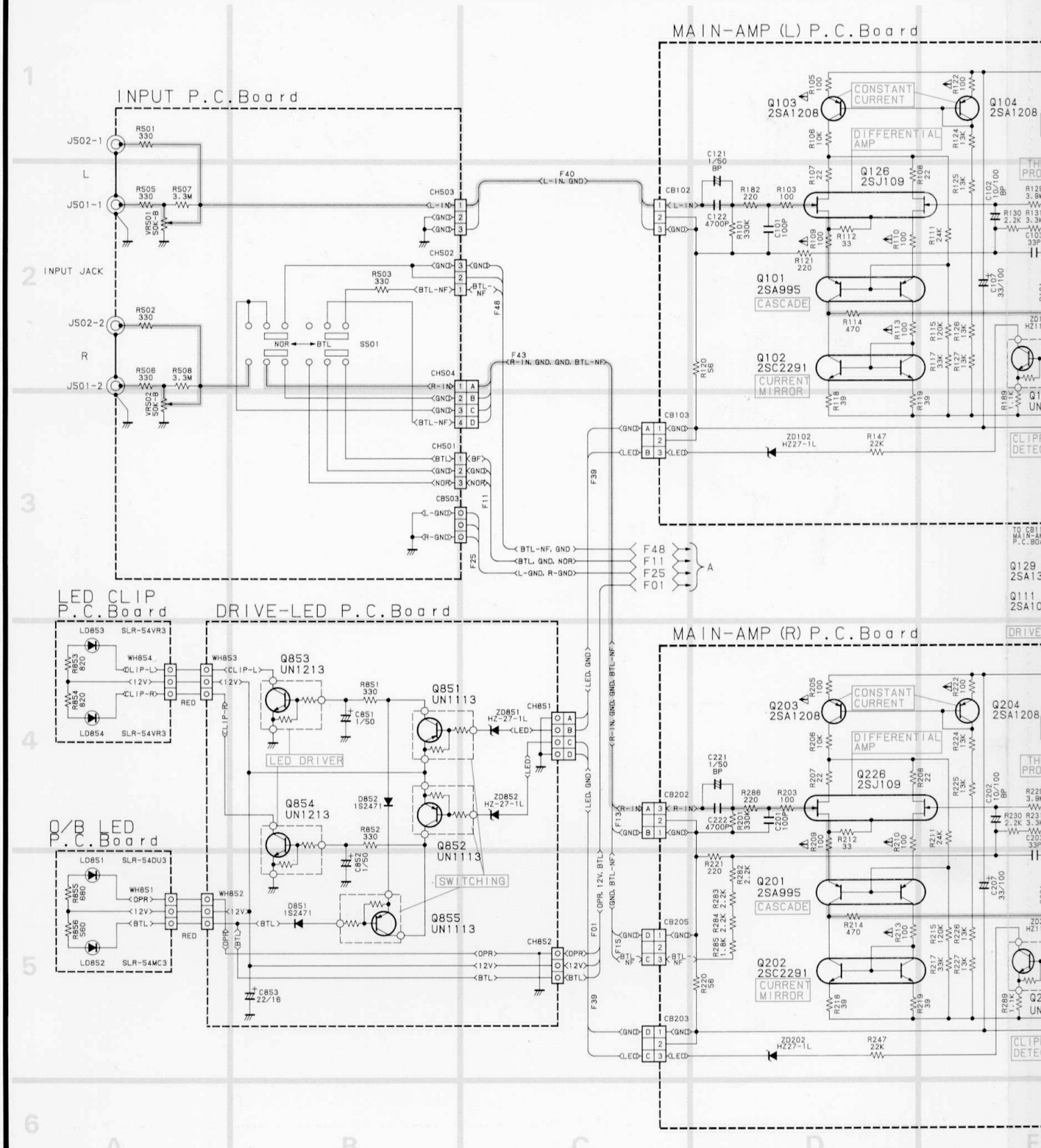

Figure 9 Main-Amp(R) P.C. Board(Component Side)

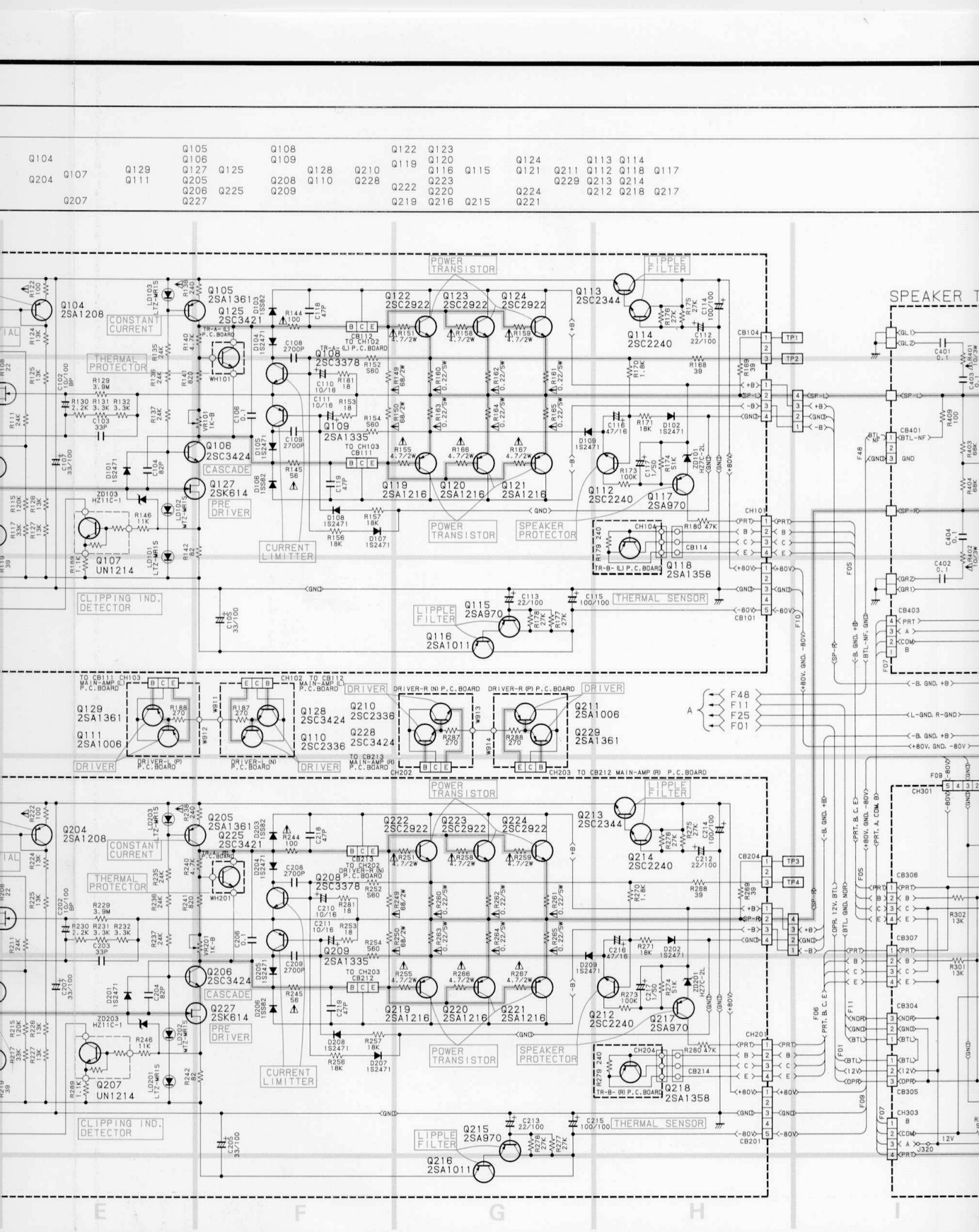
# Block Diagram



# Schematic Diagram

| | |
|---|---|
| IC | |
| Transistors (Q) | Q853 Q854 Q855 Q851 Q852 Q103 Q101 Q102 Q203 Q201 Q202 Q126 Q226 Q104 Q204 Q107 Q207 |




Q104
Q204
Q107
Q207
Q129
Q111
Q105
Q106
Q127
Q125
Q205
Q206
Q225
Q227
Q108
Q109
Q208
Q209
Q128
Q110
Q210
Q228
Q122
Q123
Q124
Q119
Q120
Q121
Q222
Q223
Q224
Q219
Q220
Q221
Q116
Q115
Q211
Q229
Q113
Q114
Q117
Q213
Q214
Q217
Q212
Q218
Q104 2SA1208
Q105 2SA1361
Q125 2SC3421
Q106 2SC3424
Q127 2SK614
Q107 UN1214
Q108 2SC3378
Q109 2SA1335
Q122 2SC2922
Q123 2SC2922
Q124 2SC2922
Q119 2SA1216
Q120 2SA1216
Q121 2SA1216
Q113 2SC2344
Q114 2SC2240
Q112 2SC2240
Q117 2SA970
Q118 2SA1358
Q115 2SA970
Q116 2SA1011
Q129 2SA1361
Q111 2SA1006
Q128 2SC3424
Q110 2SC2336
Q210 2SC2336
Q228 2SC3424
Q211 2SA1006
Q229 2SA1361
Q204 2SA1208
Q205 2SA1361
Q225 2SC3421
Q206 2SC3424
Q227 2SK614
Q207 UN1214
Q208 2SC3378
Q209 2SA1335
Q222 2SC2922
Q223 2SC2922
Q224 2SC2922
Q219 2SA1216
Q220 2SA1216
Q221 2SA1216
Q213 2SC2344
Q214 2SC2240
Q212 2SC2240
Q217 2SA970
Q218 2SA1358
Q215 2SA970
Q216 2SA1011
CONSTANT CURRENT
THERMAL PROTECTOR
CASCADE
PRE DRIVER
CURRENT LIMITTER
CLIPPING IND. DETECTOR
POWER TRANSISTOR
SPEAKER PROTECTOR
LIPPLE FILTER
THERMAL SENSOR
DRIVER
SPEAKER T
TR-A- (L) P.C.BOARD
TR-A- (R) P.C.BOARD
TR-B- (L) P.C.BOARD
TR-B- (R) P.C.BOARD
DRIVER-R (N) P.C.BOARD
DRIVER-R (P) P.C.BOARD
MAIN-AMP (L) P.C.BOARD
MAIN-AMP (R) P.C.BOARD
CB101
CB104
CB112
CB114
CB201
CB204
CB213
CB214
CB401
CB403
CB306
CB307
CB304
CB305
CH101
CH104
CH201
CH204
CH301
CH303
CH202
CH203
TO CB111 CH103
TO CB112 CH102
TO CB213 CH202
TO CB212 MAIN-AMP (R) P.C.BOARD
TO CH102 (L) P.C.BOARD
TO CH103 CB111
TO CH203 CB212
TP1
TP2
TP3
TP4
F48
F11
F25
F01
F05
F10
F07
F09
F06
F11
+80V
-80V
+B
-B
GND
12V
L-GND, R-GND
-B. GND, +B
+80V, GND, -80V
BTL-NF, GND
PRT, B, C, E
PRT, A, COM, B
BTL, GND, NOR
DPR, 12V, BTL
J320

IC301

IC302

NOTES:
1. All resistance values are in ohms. K=1,000
2. All capacitance values are in microfarads. P= $\frac{1}{1,000,000}$

Voltage Measuring Conditions
- Power Supply Voltage: AC 120V
- Measuring Meter: Digital Volt Meter
- Measuring point reference: Between Ground
- Measuring conditions: No Signal Input

Terminal Voltage

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| IC301 | -0.5V | 0V | 0V | 0V | -0.7V | 1.9V | 0V | 1.2V | 2.7V |
| IC302 | 12.1V | 0V | 17V | | | | | | |

L

| | E | C | B |
|---|---|---|---|
| Q101 | -10.85V<br>-10.86V | -79.2V | -11.35V |
| Q102 | -81.5V | -79.2V<br>-80.9V | -80.9V |
| Q103 | 81.2V | 34.1V | 80.7V |
| Q104 | 81.4V | 80.7V | 80.7V |
| Q105 | 80.1V | 1.83V | 79.5V |
| Q106 | -78.6V | -1.84V | -78V |
| Q107 | -81.5V | -43.5V | -81.2V |
| Q108 | 0V | 1.9V | 0V |
| Q109 | 0V | -1.9V | 0V |
| Q110 | 0.6V | 79V | 1.2V |
| Q111 | -0.6V | -79V | -1.2V |
| Q112 | -0.2V | 80.5V | 0V |
| Q113 | 81.6V | 82.8V | 82.2V |
| Q114 | 82.2V | 82.8V | 82.7V |
| Q115 | -82.2V | -82.8V | -82.7V |
| Q116 | -81.6V | -82.8V | -82.2V |
| Q117 | 74.2V | -0.54V | 81.2V |
| Q118 | 12.1V | 0V | 11.9V |
| Q119 | — | -79V | — |
| Q120 | — | -79V | — |
| Q121 | — | -79V | — |
| Q122 | — | 79V | — |
| Q123 | — | 79V | — |
| Q124 | — | 79V | — |
| Q125 | -1.84V | 1.83V | 1.26V |
| Q128 | 1.2V | 79V | 1.8V |
| Q129 | -1.2V | -79V | -1.8V |

R

| | E | C | B |
|---|---|---|---|
| Q201 | -10.85V<br>-10.86V | -79.2V | -11.35V |
| Q202 | -81.5V | -79.2V<br>-80.9V | -80.9V |
| Q203 | 81.2V | 34.1V | 80.7V |
| Q204 | 81.4V | 80.7V | 80.7V |
| Q205 | 80.1V | 1.83V | 79.5V |
| Q206 | -78.6V | -1.84V | -78V |
| Q207 | -81.5V | -43.5V | -81.2V |
| Q208 | 0V | 1.9V | 0V |
| Q209 | 0V | -1.9V | 0V |
| Q210 | 0.6V | 79V | 1.2V |
| Q211 | -0.6V | -79V | -1.2V |
| Q212 | -0.2V | 80.5V | 0V |
| Q213 | 81.6V | 82.8V | 82.2V |
| Q214 | 82.2V | 82.8V | 82.7V |
| Q215 | -82.2V | -82.8V | -82.7V |
| Q216 | -81.6V | -82.8V | -82.2V |
| Q217 | 74.2V | -0.54V | 81.2V |
| Q218 | 12.1V | 0V | 11.9V |
| Q219 | — | -79V | — |
| Q220 | — | -79V | — |
| Q221 | — | -79V | — |
| Q222 | — | 79V | — |
| Q223 | — | 79V | — |
| Q224 | — | 79V | — |
| Q225 | -1.84V | 1.83V | 1.26V |
| Q228 | 1.2V | 79V | 1.8V |
| Q229 | -1.2V | -79V | -1.8V |

| | S | D | G |
|---|---|---|---|
| Q126 | -0.44V | -10.7V | 0V |
| Q127 | -78.6V | -81.2V | -79V |
| Q226 | -0.44V | -10.7V | 0V |
| Q227 | -78.6V | -81.2V | -79V |

| | E | C | B |
|---|---|---|---|
| Q851 | 12V | 0V | 12V |
| Q852 | 12V | 0V | 12V |
| Q853 | 0V | 12V | 0V |
| Q854 | 0V | 12V | 0V |
| Q855 | 0V | 0V | 12V |

SPEAKER TERMINAL P.C.Board

POWER SUPPLY P.C.Board

CAUTION:
The ⚠ mark, the symbol NO. in a box in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list.